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REVIEW

Pollen and Spore Morphology/Plant Taxonomy. Gymnospermae, Pteridophyta, Bryophyta (Illustrations). (An Introduction to Palynology. II). By GUNNAR ERDTMAN. 151 pp., frontispiece, 5 plates, 265 figs. Almquist & Wilsell, Stockholm, 1957. \$8.00.

Over a period of more than 13 years, Gunnar Erdtman has undertaken the voluminous task of describing and illustrating representative pollen and spores of the world's plants. His contribution toward better understanding of the fundamentals of microspore morphology has given world-wide impetus to the development of this aspect of plant morphology and to palynology.

Erdtman's earlier publications were largely concerned with the pollen morphology of the more common angiosperms and gymnosperms in the experience of the Pleistocene pollen-analyst. Pollen workers, 10-15 years ago, were generally satisfied with knowing the gross morphologic features and key characteristics of pollen of the common wind-pollinated genera. Within the past few years, however, the boundaries of pollen work have been vastly expanded. The need for a thorough understanding of the pollen morphology of living plants has become increasingly apparent in identification and interpretation of fossil pollen, as well as a basis for the application of pollen morphology to systematic studies. Need for clarification of many of the details of microspore morphology and knowledge of pollen and spores of increasing numbers of plants has been answered in part by two volumes recently published by Erdtman. "An Introduction to Palynology. I. Pollen Morphology and Plant Taxonomy. Angiosperms" appeared in 1952. The volume being reviewed, "An Introduction to Palynology. II.", comprises the illustrations to the text of a treatise (Vol. III) on the morphology of microspores of the gymnosperms, pteridophytes and bryophytes which will be published at a later date.

Volume II includes "palynograms" (diagrammatic drawings showing the gross morphology of the grains as well as details of the surface pattern and exine stratification), a few photomicrographs and some electron micrographs of thin sections through spore walls of representatives of 12 gymnosperm families, 29 pteridophytic and 63 bryophytic families (23 Hepaticae and 40 Musci). Also included are similar illustrations for the surface pattern of, and optical sections through, the megaspore

membrane of a few members of the Cupressaceae, Pinaceae and Podocarpaceae among the gymnosperms and the Isoetaceae, Pilulariaceae and Selaginellaceae among the pteridophytes. The illustrations are arranged in sections dealing with each of the major groups: Gymnospermae, Pteridophyta and Bryophyta. Within each section the figures are placed alphabetically by genus. Reference to the family to which each genus belongs is made only at the beginning of the section. Spore palynograms of the Hepaticae and Musci are ordered alphabetically without regard to their class within the Bryophyta. This treatment makes for much clumsiness in use of the book by other than one well informed with the taxonomy of each group, and is the most serious fault one may find with this publication. Part of the difficulty could have been overcome by cross-referencing all genera to family. An arrangement in conformity with an acceptable taxonomic hierarchy would have been far more satisfactory, however, in gaining understanding of the overall microspore morphology of a family in terms of the representatives illustrated, or in attempting to compare the spore morphology of related families. One other less serious criticism which might be leveled at this publication is that concerning the number of figures and plates (3 out of 5) which have appeared already in other publications which most palynologists and others interested in microspore morphology would have seen. Some 17 figures and plates, in large part, or the only illustrations for *Abies*, *Cedrus*, *Ephedra*, *Keteleeria*, *Picea*, *Pinus*, *Pseudolarix*, *Lycopodium*, *Ophioglossum*, members of the Hedwigiaceae, Schizaeaceae and Marattiales, have already appeared in one or both of two periodicals in 1954 and 1956: the *Svensk Botanisk Tidskrift* and *Grana Palynologica*. We might suggest that this material could have been supplemented by additional data for these genera or groups in the present publication which purports to be a survey of a large group of plants. While not serious, numerous other obvious errors impair slightly the usefulness of this publication. There is no reference to illustrations of members of the Podocarpaceae (Gymnospermae) other than to one figure of the megaspore membrane of *Dacrydium cupressinum*. Microspores of six podocarpaceous genera are figured. Family references have also been omitted from the lists prefacing sections on Pteridophyta and Bryophyta for *Negripteris incana* (fig. 148, p. 81); *Oleandra neriiformis* (fig. 150, p. 81); *Athalamia nana* (fig. 196, p. 101); *Brachiolejeunia sandwicensis* (fig. 198, p. 102); and *Southbya stillicidiorum* (fig. 245, p. 121). Other errors include absence of page numbers for some figures, or mistakes in page numbers for figures and plates.

A brief Introduction discusses exine morphology and the nature of the bladder among the winged (or saccate) gymnosperms (members of the Pinaceae and Podocarpaceae). Some of the terminology used was introduced and defined in the earlier, 1952, publication. Other terms (mesosaccia, aposaccia, cristae marginales, etc.) are apparently newly introduced further to confuse the already over-termed pollen morphologist. A twenty-two page supplement, containing technical articles by B. M. Afzelius and J. Radwan Praglowski on electron microscopy and cutting ultra-thin sections as an aid to study of exine stratification, completes this publication. Praglowski's article is simply and well presented and well illustrated, and is very welcome to those desiring to undertake the sectioning of pollen grain exines.

It is unfortunate that Vol. II has been published without the proposed accompanying text. The appearance of Vol. III, hopefully in the near future, will be awaited with interest.—JANE GRAY, Geochronology Laboratories, University of Arizona, Tucson.

NOTES AND NEWS

THE OCCURRENCE OF *PILOSTYLES THURBERI* (RAFFLESIACEAE) IN CALIFORNIA. In various articles and manuals relating to the vegetation of Arizona and California the suggestion has been made that *Pilostyles thurberi* Gray may occur in the desert areas of southern California. Never, as far as I am aware, has a documentation of this